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EXAMINER

BOUTSIKARIS, LEONIDAS

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/014,681  
Filing Date: December 11, 2001  
Appellant(s): KLUG ET AL.

**MAILED**  
**FEB 05 2007**  
**GROUP 2600**

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Marc R. Ascolese  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 9/6/2006 appealing from the Office action mailed 1/25/2006.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

No amendment after final has been filed.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

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**(8) Evidence Relied Upon**

4,834,476	BENTON	5-1989
5,223,955	ZABKA	6-1993
5,317,435	KASAZUMI	5-1994
5,949,559	KIHARA	9-1999

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 39-41, 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kihara (US 5,949,559) in view of Zabka (US 5,223,955).

Regarding claims 39, 57, Kihara discloses a system and a method for recording holographic stereograms, the system comprising (Figs. 3A, 3B):

a light source 31 for producing a coherent beam L1;

a beam splitter 33 that splits the coherent beam into an object beam L4 and a reference beam L3;

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a material holder 50 holding a holographic recording material 30 having elemental holograms;

an object beam unit (Fig. 3B) for displaying a rendered image and for conditioning the object beam with the rendered image to interfere with the reference beam at a chosen elemental hologram;

a computer programmed to control the interference of the object beam L4 and the reference beam L3 and the delivery of the image to the object beam unit (line 15, col. 4 to line 33, col. 6).

However, Kihara's system lacks a lens located in the path of the object beam, between the condensing lens 43 and the holographic material 30, and proximate to the holographic material, the lens being used to control the size of the elemental hologram being recorded and make the rendered image appear to be further away from the holographic recording material. Zabka discloses a system for recording a sequence of elemental holograms in holographic material 53, wherein an additional lens 47 is placed between the condensing lens 43 and the holographic material 53 (Figs. 1, 7a, 8a, lines 4-12, col. 6). The purpose of the second lens 47 is to change the apparent depth of the field view as well as the size of the hologram (as affecting the focus of the system), see lines 9-12, col. 6, and 60-61, col. 7. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a second lens between the condensing lens and the holographic material in Kihara's system, as taught by Zabka, for achieving easy focus control, flexibility and enhancement of image fidelity (see lines 4-12, col. 6 in Zabka).

Regarding claims 40-41, the optical system of Kihara also includes an SLM 41 for displaying an image. However, Kihara in view of Zabka does not specify the focal length of the second, voxel control lens located between the condensing lens 43 and the holographic material 30. It would have been obvious to one of ordinary skill in the art to use such a lens with focal length approximately equal to its distance from the SLM or the image of the SLM, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Here, the result effective variable is the focal length of the lens. The above arrangement is common in Fourier holography, since it provides better imaging performance.

Claims 36-38, 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kihara (US 5,949,559) in view of Kasazumi (US 5,317,435) and Benton (US 4,834,476).

Regarding claims 36-38, and as described above, Kihara discloses all the limitations of said claim, including the limitation that the system comprises a diffuser 42 disposed in the object beam path and a masking plate 44 disposed in the object beam path. However, Kihara does not teach that the diffuser may have a deterministic phase pattern designed to diffuse light in at least one of a specific pattern and a specific direction, or that the masking plate is disposed in the reference beam path (in contrast to the system of Kihara, where the recording geometry is for recording reflection holograms, i.e., a holographic recording setup where the object beam and the reference beam are incident onto the recording material from opposite sides, and the masking plate is placed in the object beam path in front of the holographic recording material).

Kasazumi discloses a holographic recording system wherein a diffuser 200 is disposed in the object beam path (Fig. 3a), the diffuser comprising a deterministic phase pattern (Fig. 3c), and designed to diffuse light in a specific direction (line 55, col. 5 to line 19, col. 6). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a diffuser of the kind taught by Kasazumi in the system of Kihara, for achieving holographic image recording of high quality with little speckle noise (see lines 21-24, col. 6 in Kasazumi).

Benton discloses a system for recording holographic stereograms, wherein the two recording beams are in a transmission geometry (i.e., both recording beams are incident onto the recording material from the same side), and an aperture 28 is placed in the path of the reference beam (as well as in the path of the object beam); see Fig. 1. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the system of Kihara in a transmission geometry, thus placing a masking plate in the path of the reference beam, since the two recording geometries are equivalent structures known in the art (as evidenced by Benton). The choice of the recording geometry depends on the specifics of the desired performance characteristics, such as diffraction efficiency, etc.

It is noted that the diffuser and the masking plate act in concert to allow exposure of a particular hogel (see lines 17-19, col. 6 in Kihara), and that the diffuser is band-limited since it is designed to act on laser light of a specific wavelength band. Finally, even though Kihara does not explicitly teach that the diffuser and the masking plate are removable and possess positioning adjustment devices, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make said components removable, since it has been held that constructing a formerly integral structure in various elements involves only routine skill in the art. *Nerwin v.*

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*Erlichman*, 168 USPQ 177, 179. The ability to move the diffuser and the masking plate allows for a desired diffusion effect as well as for a choice of a hogel of a desired size.

Regarding claim 64, it is noted that the diffuser and the masking plate in Kihara's system are positioned so that they can be replaced by respective second diffuser and masking plate, the latter pair producing one of a larger, smaller or differently shaped elemental hologram.

## **(10) Response to Appellant's Arguments**

### **I. Arguments regarding claims 39-41, and 57**

First, Appellant argues that the addition of a lens between condensing lens 43 and the holographic recording material 30 (see Fig. 3B in Kihara) in the recording system of Kihara, as taught by Zabka, does not allow for varying the size of at least one voxel, i.e., elemental hologram. The examiner respectfully disagrees and notes that Zabka specifically states that the inclusion of an additional lens 47 "affects... the size of the resulting image", lines 52-53, col. 7. The "resulting image" is exactly the recorded elemental hologram. In addition, it is noted that the claim language only recites the lens as being "capable" of the above function, and it is not definite as to whether said lens does have such property.

Second, in response to the argument that the additional lens does not affect the position of the virtual image of the SLM element (i.e., the image being recorded as a hologram), Zabka specifically states that "[t]he image 97 will appear to have greater depth", see lines 60-61, col. 7. Additionally, it is noted that the claim language only recites the lens as being "capable" of the above function, and it is not definite as to whether said lens does have such property.

Third, regarding the argument that there is no motivation to incorporate Zabka's lens 47 into Kihara's system because it is not needed, the examiner notes that Zabka is specific in listing some reasons for including a second lens between the first condensing lens 43 and the holographic material 53, namely, enhancement of image fidelity and more focus control, including depth of field of the recorded hologram (lines 4-12, col. 6 in Zabka).

Finally, even though the claim language recites the voxel-control lens being "proximate to the holographic recording material", it does not recite with any degree of specificity the amount of proximity, and clearly lens 47 is "proximate" to holographic material 51 (see Fig. 1).

In summary, all elements of said claims are taught or suggested by Kihara and Zabka, and Zabka (which is analogous art with Kihara) provides the motivation for combining the two references, as described above.

## **II. Arguments regarding claims 36-38, and 64**

Appellant argues that Kasazumi (which was cited for providing the teaching of a diffuser, which has a deterministic phase pattern formed thereupon) does not teach that said diffuser is removable, band-limited, or is designed for a wavelength corresponding to a wavelength of the coherent beam. The examiner respectfully disagrees and notes that the diffuser disclosed by Kasazumi is a diffractive structure, comprising a pattern of protrusions and recesses designed in such a way to impose a specific phase distribution on incident coherent light emitted by a laser source 10 (lines 55-6, col. 5). A diffractive optical element is designed for diffracting incident light that has a specific wavelength (or wavelength in a specific range of wavelengths). A diffractive element, unlike other optical elements, such as refractive lenses, and prisms, is operational only for specific wavelengths. In fact, incident light that has wavelength outside the

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designed band, is transmitted through the diffractive element without any diffraction occurring, in other words said light is “blind” to the diffractive element if the operational wavelength is not the proper one. In the present case, the holographic recording system of Kihara utilizes a specific laser source (argon laser) emitting light in a specific wavelength band (514.5 nm, see lines 26-28, col. 4) therefore, a diffuser device used in conjunction with said holographic system is designed to operate in said wavelength band only. Furthermore, Kihara teaches that the diffuser panel 42 may be moved each time a hologram is recorded (lines 49-54, col. 5), i.e., Kihara suggests “removability” of the diffuser.

Finally, regarding the argument that the Office Action failed to show that the masking 44 and the diffuser in Kihara’s system form a matched set configured to allow exposure of a particular size hogel, it is noted that Kihara explicitly teaches that “the diffusion done by the diffuser panel 42 and the screening of the unnecessary light through the mask 44 make it possible to obtain the uniform and proper exposure width”, see lines 17-19, col. 6. In other words, Kihara teaches that the two elements act in concert, as a matched set, during the holographic recording to allow exposure (to light) of a particular size hogel.

#### **(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner’s answer.

For the above reasons, it is believed that the rejections should be sustained.

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Respectfully submitted,

**LEONIDAS BOUTSIKARIS**  
**PRIMARY EXAMINER**

Leo Boutsikaris, Ph.D., J.D.

Primary Patent Examiner, AU 2872



January 29, 2006

Conferees:

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